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Two new species of Aleocharinae (Coleoptera, Staphylinidae) found in fungus gardens of *Odontotermes* termites (Isoptera, Termitidae, Macrotermitinae) in Khao Yai National Park, Thailand

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Abstract

Discoxenus katayamai **sp. n.** and *Odontoxenus thailandicus* **sp. n.** are described from Khao Yai National Park, East Thailand. Both species were collected from nests of termite of the genus *Odontotermes* Holmgren, 1912. These are the first records of both genera from Thailand. *Discoxenus katayamai* is similar to *D. indicus* Wasmann, 1904, and *O. thailandicus* is similar to *O. butteri* (Wasmann, 1916). Each species is easily distinguished from their congeners by the body size, the number of the setae on the pronotum, elytra and abdomen and other characters discussed below.

Keywords

New species, *Odontotermes*, Compactopediina, Aleocharini, Pygostenini, *Discoxenus katayamai* sp. n., *Odontoxenus thailandicus* sp. n., termitophily

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Introduction

Many species of insects are known to be associated with termites, and especially with fungus-growing termites of the genus *Odontotermes* Holmgren, 1912, which is a host for various groups of termitophiles in their fungus gardens, e.g., beetles, flies and silverfish (Wasmann 1904, 1912, 1916; Kistner 1969). David H. Kistner investigated the termitophile fauna in Khao Yai National Park, Thailand, and reported some new species of staphylinid beetles (Kistner and Newton 1999; Jacobson and Kistner, 1999) and a few scuttle flies (Disney and Kistner 1997). However, no staphylinid beetles associated with *Odontotermes* termites have been reported from Thailand.

In 2007, the junior author and his colleagues investigated termitophilous insects in Khao Yai National Park, and they found several new species of termitophiles. Two of them are described new species of staphylinid beetles, one in the genus *Discoxenus* (Wasmann, 1904) belonging to the tribe Aleocharini and one in *Odontoxenus* Kistner, 1958 belonging to the tribe Pygostenini. All the specimens were found in fungus gardens of *Odontotermes* termites; both genera have not been previously known from Thailand.

The genus *Discoxenus* was described by Wasmann (1904) to accommodate two species from India. Later Wasmann (1916) described two species from Sri Lanka. Kistner (1975) revised the genus and added three species from India, Malaysia and Myanmar. Thus, seven *Discoxenus* species have been known in the Oriental Region.

The genus *Odontoxenus* was established by Kistner (1958) for 12 species originally described as the members of *Doryloxenus* Wasmann, 1898 by Wasmann (1904, 1916), Cameron (1926, 1932), Kemner (1929), and as *Mimocete* Fauvel, 1899 by Fauvel (1899). Later, Jacobson and Kistner (1975a) added one species and Jacobson and Kistner (1975b) reviewed the genus. Later, Kistner (2005) described one new species from Malaysia. Up to now, 14 species have been described from India, Sri Lanka, Indonesia and Malaysia.

Material and methods

The field research was conducted in 2007, by M. Maruyama, Yûji Katayama and Takashi Komatsu in Khao Yai National Park, 30 km northeast of Bangkok. The fungus garden was carefully removed from the nest and crushed little by little on a white plastic tray to find symbiotic insects. The insects were observed and photographed on fragments of the fungus garden. They were finally put in 2 ml vials with 80% ethanol.

The technical procedures used here are generally as described in Maruyama (2006). Measurements are all in millimeters with averages and standard variations in parentheses.

Number of macrosetae is confined to both sides of the body, except for that of tergite IX on one side of the body.

Habitus photographs were taken with Microptics system and merged with the automontage software CombineZM.

The symbiotic termite was identified by Yoko Takematsu. However, the current taxonomic status of the genus *Odontotermes* is still not settled, and the identification of the termite species in this paper is tentative (Takematsu, personal communication).

Holotypes and most of the paratypes of new species are deposited in the Kyushu University Museum (KUM), and some of paratypes are deposited in the National Park, Wildlife and Plant Conservation Department, Thailand (DNP).

Taxonomy

Genus *Discoxenus* Wasmann

Wasmann 1904: 655 (original description); Kistner 1982: 165 (revision).

Comments. This genus is similar to *Compactopedia* Kistner, 1970, associated with termites of the genus *Longipeditermes* Haviland, 1898 in Malaysia, from which *Discoxenus* is distinguished by the body being smaller, the antennae being thicker and the tarsal formula 4-4-5 (Kistner 1982). It is new record from Thailand.

Discoxenus katayamai Kanao & Maruyama, sp. n.

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Figs 1, 2, 5C

Type series: Holotype: ♂, "Thai: Nakhon Nayok, Khao Yai National Park, Mo Sing To (700 m alt.), 26 IX 2007, Maruyama M. and Katayama Y. leg. // Holotype *Discoxenus katayamai* des. Kanao & Maruyama, 2010", abdomen dissected and mounted in Euparal (KUM). Palatypes: 2♀, 23 sex?, same data as holotype; 8 sex?, ditto, but 28 IX 2007 (KUM, DNP).

Symbiotic host: *Odontotermes proformosanus* Ahmad, 1965.

Etymology: Dedicated to Y. Katayama, a collector of the type series.

Diagnosis. This species is similar to *D. indicus* through the shape of the median lobe of the aedeagus, but may be distinguished from it by the shorter body and by the number of setae on tergites III and IV, six setae on each. The smallest species of the genus.

Description. Body (Figs 1A–1B) almost uniformly orange brown, but antennae and elytra slightly darker, apical segments of antennae lighter than middle segments. Dorsal surfaces of pronotum, elytra and abdomen (Fig. 1A) smooth, glossy; elytra and abdomen (Figs 1A–1B, 2B) sparsely covered with long yellow setae. Pronotum (Figs 1A, 2A) moderately covered with macrosetae. Antennae (Figs 1A–1B) with segment I much longer than wide; segment II reduced; segment III–VII transverse; segment VIII–X subquadrate; segment XI conical, twice as long

Figure 1. Habitus of *Discoxenus katayamai*. **A** dorsal view and **B** ventral view.

as wide, blunt at apex. Elytron (Fig. 2B) 2/3 as long as pronotum, with a row of 4 macrosetae, about 10 setae on lateral margin, and with 10–11 macrosetae and about 30 setae on dorsal surface. Abdominal tergite VIII (Fig. 2C) with 4 pairs of macrosetae along lateral margins and 14–15 pairs of setae on dorsal surface; macrochaetotaxy of abdominal tergites II–VIII: 0, 6, 6 (7), 6, 6, 6, 8; each sternite (Fig. 1B) with macrosetae on posterior marginal row. Median lobe of aedeagus elongate (Fig. 2D); apical lobe slightly curved paramerally; distal crest well produce. Spermatheca (Fig. 2E) with apical part swollen, its inner wall densely wrinkled from apex to around apical 3/5 of its length; basal part twice as long as apical part and slightly curved near apex.

Measurements. Body length: ca. 1.8–2.2; pronotal length: 0.41–0.56 (0.46±0.053); pronotal width: 0.70–0.82 (0.75±0.046); antennal length: 0.54–0.65 (0.62±0.045). N=10.

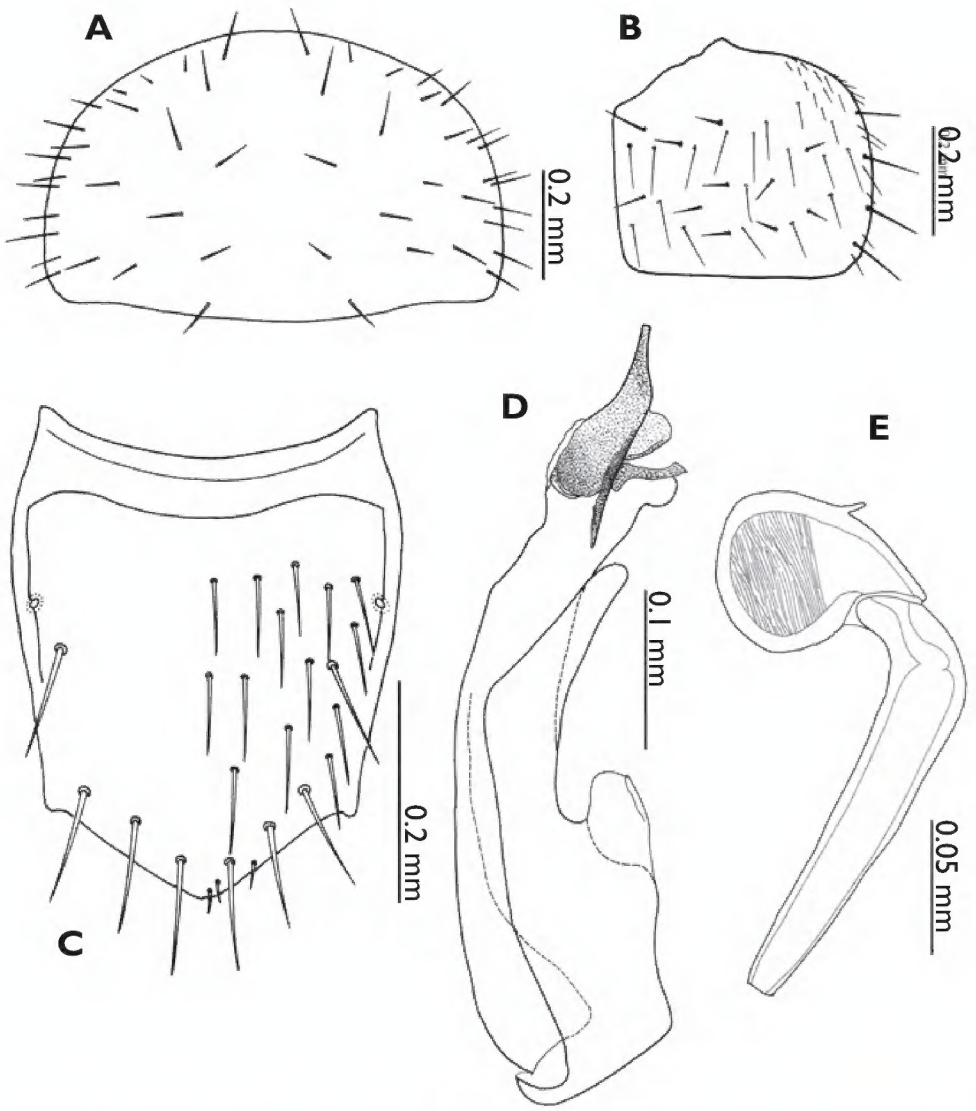

Figure 2. *Discoxenus katayamai.* **A** pronotum **B** elytron **C** abdominal tergite VIII **D** median lobe of aedeagus, in lateral view, and **E** spermatheca.

Genus *Odontoxenus* Kistner

Kistner 1958: 104 (original description); Jacobson and Kistner 1975: 293 (key, diagnosis).

Comments. This genus in general appearance and body size is similar to *Doryloxenus* among the Asian genera of Pygostenini, but distinguished from it by the shape and position of eyes having part of their surface on the anterior margin of the head, the relatively long mesosternum, and the reduced 4-segmented tarsi (Jacobson and Kistner 1975).

Odontoxenus thailandicus Kanao & Maruyama, sp. n.

urn:lsid:zoobank.org:act:EF7AED85-A974-4EE3-9144-D5B6B6BDE487
Figs 3, 4, 5D

Type series. Holotype: ♂, "Thai: Nakhon Nayok, Khao Yai National Park, Mo Sing To (700 m alt.), 28 IX 2007, Maruyama M. and Katayama Y. leg. // Holotype *Odon-*

Figure 3. Habitus of *Odontoxenus thailandicus*. **A** dorsal view and **B** lateral view.

toxenus thailandicus des. Kanao & Maruyama, 2010". Palatypes: 2♀, same data as holotype; 2♂, 2♀, ditto, but 26 IX 2007.

Symbiotic host: *Odontotermes proformosanus* Ahmad, 1965

Etymology. Named after the type locality.

Diagnosis. Most similar to *O. butteri* (Wasmann, 1916) and *O. malaysianus* Kistner, 2005 through the pronotum with a row of macrosetae at the lateral margin, but distinguished from them by the macrochaetotaxy of the tergites II–VIII: 0, 2, 2, 2, 4, 6, 8.

Description. Body (Figs 3A–3B) almost uniformly reddish brown; head and elytra slightly darker. Dorsal surfaces of head, pronotum and elytra (Fig. 3A) smooth, glossy and glabrous. Head to elytra (Fig. 3B) well convex, laterally curved in shape of half cir-

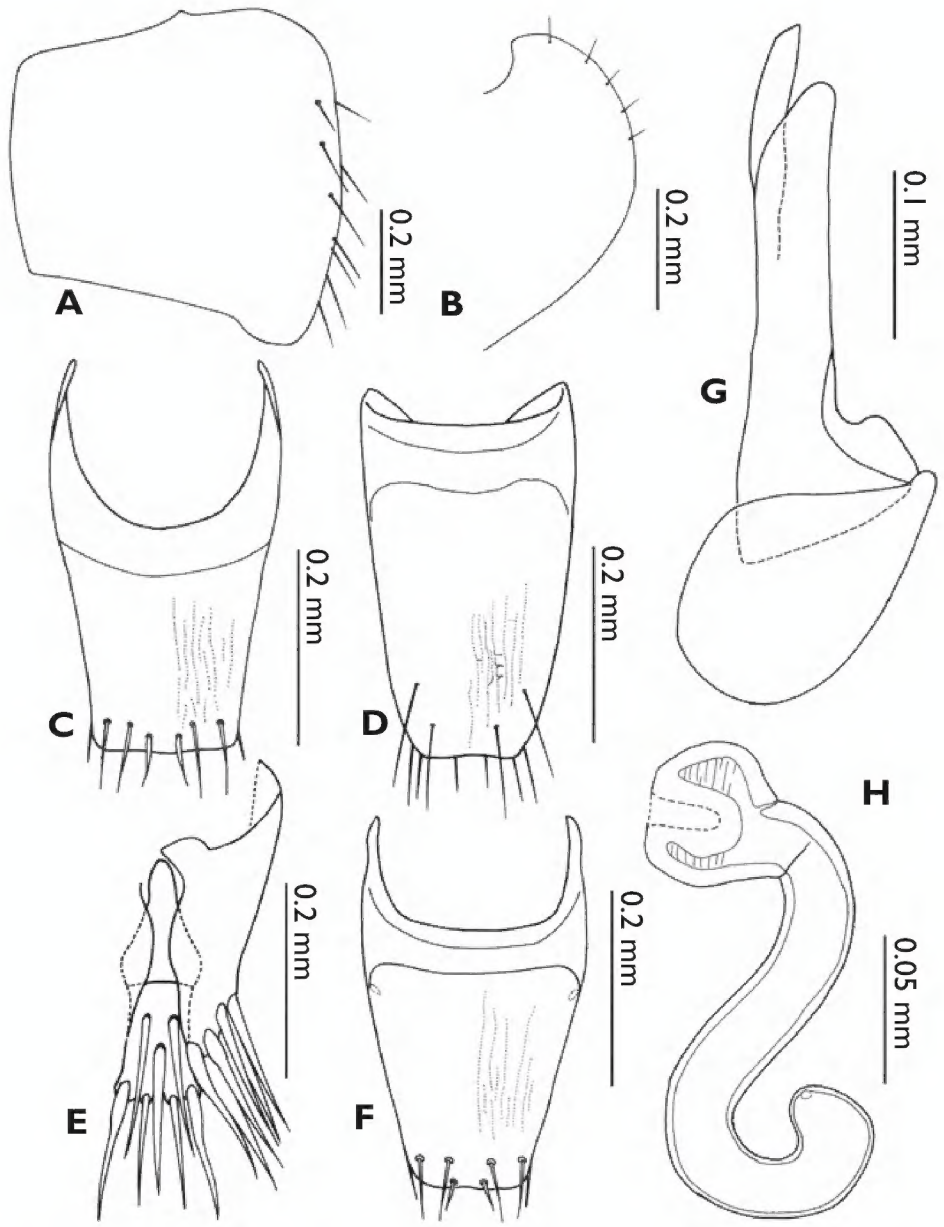

Figure 4. *Odontoxenus thailandicus*. **A** elytron **B** pronotum **C** male abdominal tergite VIII **D** male abdominal sternite VIII **E** male abdominal tergite IV & V **F** female abdominal tergite VIII **G** median lobe of aedeagus, and **H** spermatheca.

cle. Pronotum (Figs 3A–3B, 4B) much narrower than elytra, with a row of 5 macrosetae on lateral margin. Elytra (Figs 3A–3B, 4A) with inflexed lateral margins, and about 10 macrosetae on lateral margins. Macrochaetotaxy of abdominal tergites II–VIII: 0, 2, 2, 2, 4, 6, 8; male abdominal tergite VIII (Fig. 4C) slightly truncate at apex and slightly wrinkled on dorsal surface, with 3 pairs of macrosetae near apex (1 laterally, 2 dorsally), and with 1 pair of flattened setae at apex; sternite VIII (Fig. 4D) with 2 pairs of macrosetae on dorsal surface and 3 pairs at apex; female tergite VIII (Fig. 4F) with basal projections and macrosetae shorter than in male. Tergite IX (Fig. 4E) with 7 pairs of macrosetae laterally; tergite X (Fig. 4E) with 3 macrosetae around middle and 2 pairs of macrosetae at apex. Median lobe of aedeagus (Fig. 4G) with apical lobe almost straight, much narrower than basal capsule; copulatory piece membranous; basal capsule swollen, half as long as apical lobe. Spermatheca (Fig. 4H) curved twice, S-shaped; apical part swollen, its inner wall hollowed at apex, densely wrinkled from apex to around apical 1/3; basal part 2.5 times as long as apical part, roundly curved around basal 1/3 and gently curved around apex.

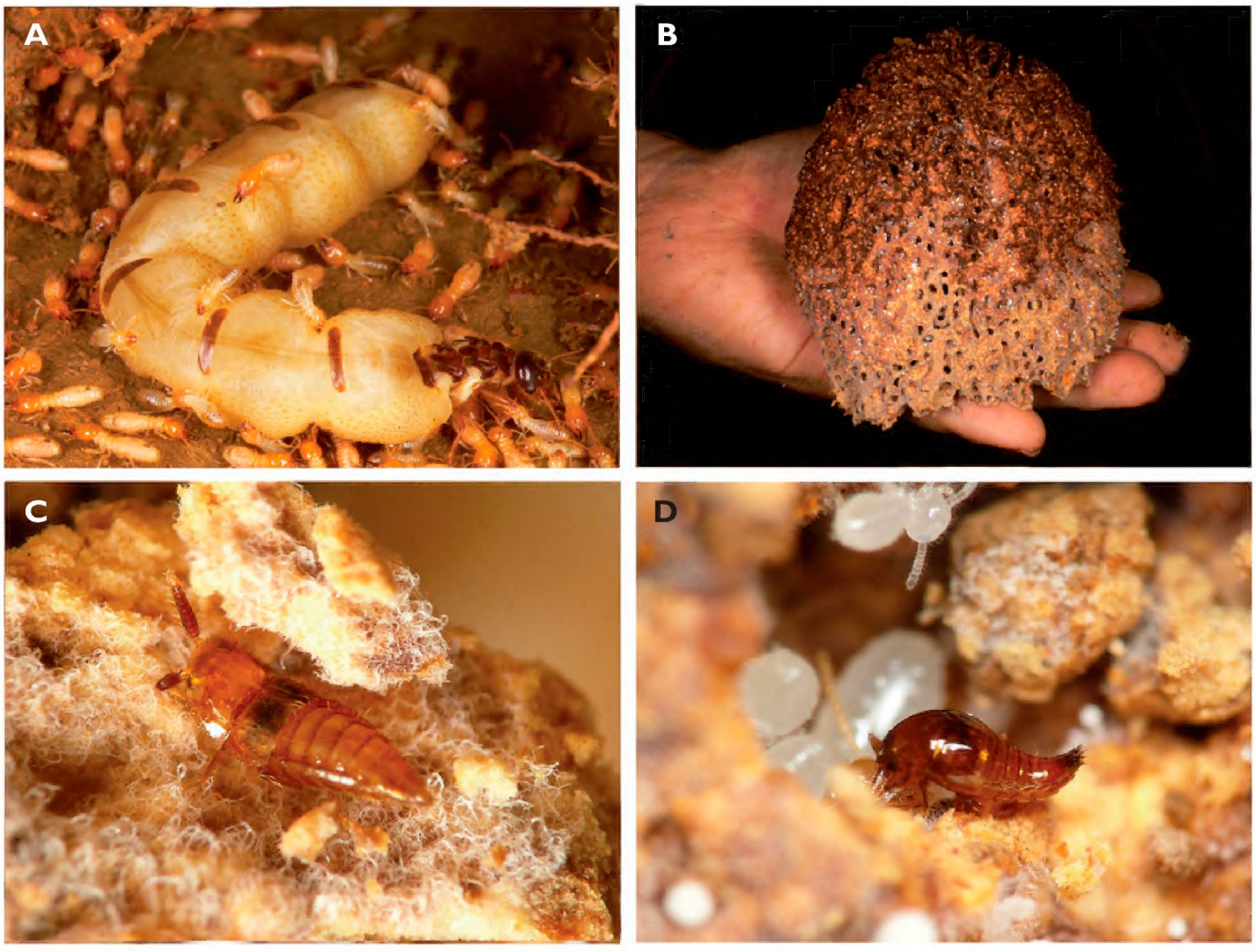

Figure 5. A *Odontotermes proformosana*, queen, workers and soldiers **B** the fungus garden of *O. proformosana* **C** *Discoxenus katayamai*, on fungus garden **D** *Odontoxenus thailandicus*, on fungus garden. Photos © Y. Katayama (**5A–5B**), T. Komatsu (**5C–5D**), 2007.

Measurements. Body length: ca. 1.7–2.0; pronotal length: 0.44–0.51 (0.47±0.031); pronotal width: 0.64–0.73 (0.68±0.037); antennal length: 0.29–0.30 (0.30±0.012). N=5.

Biological notes

These new species were found in the fungus gardens of *Odontotermes proformosanus* (Figs 5A–5B). The scuttle flies *Clitelloxenus perdosetae* Disney, 1997, *C. thailandae* Disney, 1997, *Franssenia* sp., *Crasilla* sp. and *Dicranopteron* sp. were also caught at the same time. The individual number of each species was very low, compared to *D. malaysianus* collected in a high number from a few *Odonototermes* Holmgren, 1912 nests in Malaysia (Kistner 1982). Only a few specimens of *D. katayamai* (Fig. 5C) were found in one nest, which generally contained one to ten, fist-sized fungus gardens, and none or one specimen of *O. thailandicus* was found in one nest, though density of the host termites was very high at Mo Sing To, the type locality of the present new species. The behavior of *D. katayamai* was almost the same as it was reported for *D. malaysiensis* by Kistner (1982). The behavior of *O. thailandicus*

(Fig. 5D) was similar to that of *D. katayamai*, but it moved much slower than *D. katayamai* and it often stopped.

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